

N° 27,118



A.D. 1913

Date of Application, No. 27,118, 25th Nov., 1913

" " No. 8000, 30th Mar., 1914

Complete Specification Left, 25th May, 1914.

(Section 16 of the Patents and Designs Act, 1907.)

Complete Specification Accepted, 1st Oct., 1914

### PROVISIONAL SPECIFICATION.

No. 27,118, A.D. 1913.

### Improvements in or relating to Pneumatic Tyres and their Manufacture.

I, JOHN MACKENZIE O'BRIEN, of 10, Rydal Road, Streatham, in the County of London, India Rubber Expert, do hereby declare the nature of this invention to be as follows:—

The invention relates to pneumatic tyres, more especially tyres applicable for motor vehicles.

It has been recognised that a pneumatic tyre is better fitted to fulfil its purpose when the tread portion is very thick yet narrow, as in this way the liability to puncture is reduced whilst the tyre is faster in use. Heretofore however it has not been possible to manufacture such a tyre which will meet modern requirements, one of the chief objections being the inability in pneumatic tyres comprising an outer cover and an inner tube of the tyre cover to resist lateral stresses such as are experienced when negotiating a curve. This has been due to the fact that a thick and narrow tread made of rubber in the ordinary way is too supple or yielding in character.

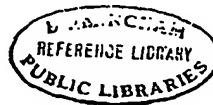
Endeavours to avoid the disadvantages due to the suppleness of the rubber by increasing the width as well as the thickness introduce undue strain on the remaining and necessarily flexible portions of the tyre cover wall causing bellows like motion with consequent overheating and cracking of the flexible rubber compound.

The defects cannot be remedied in the ordinary tyre cover by substituting a stiffer or harder grade of rubber for the softer variety, as in this case the resilience of the cover would be impaired, harmful heating would arise, and cracking of the side portions of the cover would be liable to quickly take place.

Included in the objects of the present invention is the provision of a tyre cover possessing the advantages referred to without the disadvantages, to which end it is arranged that the tread portion of the cover shall be constituted by a grade of rubber compound not readily puncturable and of sufficient stiffness or hardness as not to be adversely affected by lateral stresses occurring with rubber of a resilient character, such as is in common use, for the remainder of the outer portion of the cover. The relatively hard rubber is so disposed in the cover that it will not be subjected to action which will result in overheating, whilst at the same time it does not interfere with the resilient properties of the tyre as a whole.

The tread portion of a tyre cover according to the invention can be of any appropriate shape in cross section, conveniently more or less that of a truncated V, provided at its base or widest portion with lateral beads or extensions adapted to be covered by the ordinary rubber compound that is applied to the

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*O'Brien's Improvements in or relating to Pneumatic Tyres and their Manufacture.*

outer side of the ordinary canvas and rubber foundation of the cover and which thus serves to effectually key the tread portion of the tyre thereto.

A method of manufacturing such a tyre cover, which also forms part of the present invention, consists in extruding the hard rubber compound for the tread portion of the cover through a die of the requisite shape and thereafter curing or vulcanising it partially, that is to say sufficiently to enable it to be handled and placed in position around the canvas and foundation of the cover which may be of any ordinary or suitable kind. The soft rubber for the remainder of the cover is then placed in position, it may be in the form of strips of rubber composition, at opposite sides of the tread and so as to overlap the beads or extensions at opposite sides of the base portion thereof after which the whole is wrapped and the curing or vulcanising completed in known way. The partial curing or vulcanising of the extruded compound for the tread can be easily effected in the vulcanising chamber, without the aid of a mould, such tread portion being simply supported upon a tray, provided with a bed of French chalk. The outer peripheral portion of the tread is or may be grooved or notched transversely at intervals of its length. When wrapping a tyre cover for the curing treatment wherein the tread portion extends beyond the general curvature of the remainder of the cover, packing pieces are, or may be, introduced of such form as to render the periphery transversely of practically continuous curvature.

A composite tyre cover according to the invention can thus be manufactured in which a durable and substantial, though narrow, tread is provided which may project in a well defined manner beyond the general curvature of the remainder of the cover if so desired, in this way enabling a vehicle fitted with pneumatic tyres having such covers to be driven faster with greater safety and less scattering of mud on heavy roads than when fitted with pneumatic tyres having ordinary outer covers.

Dated this 25th day of November, 1913.

For the Applicant,

LLOYD WISE & Co.,  
10, New Court, Lincoln's Inn, London, W.C.,  
Chartered Patent Agents.

## PROVISIONAL SPECIFICATION.

No. 8000, A.D. 1914.

**Improvements in or relating to Pneumatic Tyres.**

I, JOHN MACKENZIE O'BRIEN, of 10, Rydal Road, Streatham, in the County of London, India Rubber Expert, do hereby declare the nature of this invention to be as follows:—

In the Specification of my Application for Letters Patent No. 27,118 of 1913 tyre covers are described the treads whereof, so long as they are adapted to give to the tyre the characteristics in view, are stated in general to be of any appropriate shape in cross section. One cross sectional shape has been more specifically referred to presenting a single circumferentially projecting tread portion to the roadway, but it has since been found that for some purposes it is advantageous to employ two or more such tread portions separated transversely to a certain extent. In this way there is formed an intermediate circumferential space or channel or spaces or channels which tends or tend to reduce side slip.

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The margins of such tread portion may be angular or curved or some angular and some curved.

Dated this 30th day of March, 1914.

For the Applicant,

LLOYD WISE & Co.,  
10, New Court, Lincoln's Inn, London, W.C.,  
Chartered Patent Agents.

## COMPLETE SPECIFICATION.

Improvements in or relating to the Manufacture of Covers for  
Pneumatic Tyres.

I, JOHN MACKENZIE O'BRIEN, of 10, Rydal Road, Streatham, in the County of London, India Rubber Expert, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to pneumatic tyres, more especially tyres applicable for motor vehicles.

It has been recognised that a pneumatic tyre is better fitted to fulfil its purpose when the tread portion is very thick yet narrow, as in this way the liability to puncture is reduced whilst the tyre is faster in use. Heretofore however it has not been possible to cheaply and efficiently manufacture such a tyre which will meet modern requirements, the great cost of the moulds proposed for making such tyres constituting a great drawback to their manufacture.

Now an object of this invention is to avoid the necessity of using moulds for making the thickened tread portions of tyre covers and thus to avoid the disadvantages that have heretofore militated against the successful manufacture of such tyre covers at a moderate price.

For this purpose a tyre cover of the kind referred to is manufactured by a method which consists in extruding hard rubber compound through a die of the requisite shape so as to produce a tread portion for the cover and thereafter curing or vulcanising such tread portion partially, that is to say, sufficiently to enable it to be handled and placed in position around the canvas and rubber foundation of the cover which may be of any ordinary or suitable kind. Soft rubber for the remainder of the cover is then placed in position, it may be in the form of strips of rubber compound, at opposite sides of the tread and so as to overlap beads or extensions at opposite sides of the base portion thereof after which the whole is wrapped and the curing or vulcanising of the tread, soft rubber and canvas and rubber foundation of the tyre completed in any suitable or known way. The partial curing or vulcanising of the extruded hard rubber compound for the tread can be easily effected in the vulcanising chamber without the aid of a mould, such tread portion being simply supported upon a tray provided with a bed of French chalk.

In this way it is possible to produce, without employing expensive apparatus, a tyre cover the tread portion of which is constituted by a grade of rubber compound not readily puncturable and of sufficient stiffness or hardness as not to be adversely affected upon being subjected to lateral stresses, with rubber of a resilient character, such as is in common use, for the remainder of the outer portion of the cover, the relatively hard rubber being so disposed in the cover that it will not be subjected to action which will result in overheating, whilst at the same time it does not interfere with the resilient properties of the tyre as a whole.

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The tread portion of a tyre cover thus manufactured can be of any appropriate shape in cross section, having a base with lateral beads or extensions adapted to be covered by the ordinary rubber compound that is applied to the outer side of the ordinary canvas and rubber foundation of the cover and which thus serves to effectually key the tread portion of the tyre thereto.

When wrapping a tyre cover for the curing treatment wherein the hard rubber tread portion extends beyond the general curvature of the remainder of the cover, packing pieces are introduced between the wrapping and the tread portion and soft rubber side strip of such form as to render the periphery of the cover transversely of practically continuous curvature so as to ensure that the tread portion shall be properly pressed against the canvas and rubber foundation, and the side strips of soft rubber against the lateral beads or extensions of the tread portion.

In this way a composite tyre cover can be readily made in which a durable and substantial, though narrow, tread is provided which may project in a well defined manner beyond the general curvature of the remainder of the cover if so desired and thus enable a vehicle fitted with pneumatic tyres having such covers to be driven faster with greater safety and less scattering of mud and dust than when fitted with pneumatic tyres having ordinary treads.

For some purposes it is advantageous to employ two or more tread portions separated transversely to a certain extent. In this way there is formed an intermediate circumferential space or channel or spaces or channels which tends or tend to reduce side slip. This construction also helps to make the tyre more durable than a single tread for heavy motor cars.

The margins of such tread portion or portions may be angular or curved, or some angular and some curved. The outer peripheral portion of the tread is or may be grooved or notched transversely at intervals of its length.

In the accompanying drawings, Figs. 1, 2 and 3 are sections of three different forms of tyre cover exemplifying the invention. Fig. 4 shows in longitudinal section, a press and die plate for extruding hard rubber compound to form the treads and Fig. 5 is a face view of the die plate alone. Fig. 6 is a side elevation of part of a tyre cover made according to the invention.

In Fig. 1, a single tread portion *a* of hard rubber compound is employed which presents a curved surface to the roadway and projects to a moderate extent beyond the remaining ordinary soft rubber side portions *b* of the tyre cover which overlap and are united, as hereinbefore described, with the lateral beads or extensions *a'* of the tread portion *a*, the whole being applied to the outer side of the ordinary canvas and rubber foundation *c* of the tyre cover to which the tread portion *a* and side portions *b* are effectually secured in the manner hereinbefore described. This figure also shows a core *d* around which the canvas and rubber foundation *c*; the tread portion *a* of hard rubber and side portions *b* of soft rubber are placed and firmly held in position by a wrapping *e* of fabric previous to being completely vulcanised, *f* being the packing pieces for pressing the overlapping portions of the side strip *b* and beads or extensions *a'* firmly against each other and the latter against the canvas and rubber foundation *c*.

The section of the hard rubber tread portion *a* may be shaped to present an angular surface to the roadway instead of the curved surface shown in Fig. 1.

Fig. 2 illustrates a tyre cover having two hard rubber tread portions *a* carried by a common base *a<sup>2</sup>* and allied to the single tread portion *a* of Fig. 1, the tread portions being spaced apart transversely at opposite sides of a central groove *a<sup>3</sup>* for the purpose hereinbefore explained. When making this form of tyre cover which is found to give very satisfactory results in practice, a packing strip may be placed in the groove *a<sup>3</sup>* between the two tread portions *a* to press the adjacent portion of the base piece *a<sup>2</sup>* firmly against the canvas and rubber foundation *c*.

Fig. 3 shows a tyre cover wherein three hard rubber tread portions *a* carried by a common base *a<sup>2</sup>* are separated transversely one from the other.

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Figs. 4 and 5 show a press suitable for forming the hard rubber tread portions. It comprises a cylinder *h* suitable for holding unvulcanized hard rubber compound *i* to form the tread portions, a die plate *j* the aperture *k* in which corresponds in shape to the section of the hard rubber treads to be produced and a follower *m* by operating which, as by a hand wheel and screw *n*, the hard rubber compound can be forced through the aperture in the die plate on to a support or carrier *o* arranged to receive it.

Fig. 6 indicates at *p* how the hard rubber tread portion *a*, or each such portion, can be transversely grooved.

10 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The herein described method of manufacturing a tyre cover which consists in extruding hard rubber compound through a die to form a tread portion or  
15 portions, thereafter curing or vulcanizing such tread portion or portions partially and afterwards placing it or them in proper position in relation to the canvas and rubber foundation and soft rubber for the remainder of the cover and completing the curing or vulcanizing, substantially as described.

2. A composite tyre cover made according to the preceding claim having two  
20 parallel hard rubber tread portions separated by a centrally arranged peripheral groove, substantially as described.

3. Tyre covers having thick yet narrow tread portions constituted by a grade of rubber compound that is not readily puncturable and of sufficient stiffness or hardness as not to be adversely affected by lateral stresses extruded through  
25 a die and treated as in Claim 1, the finished covers being substantially of the sections shown respectively in Fig. 1, in Fig. 2 or in Fig. 3 of the accompanying drawings.

Dated this 25th day of May, 1914.

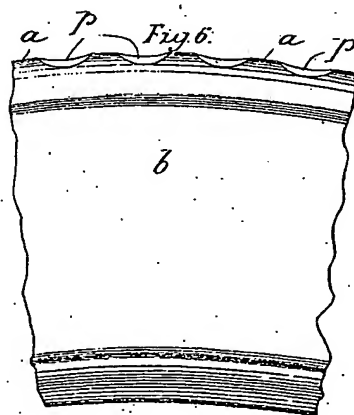
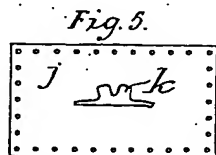
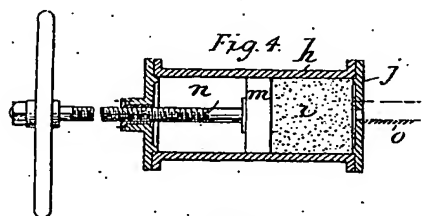
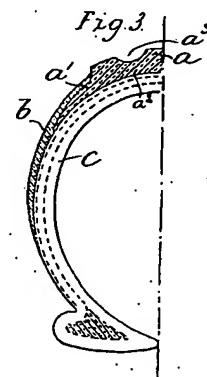
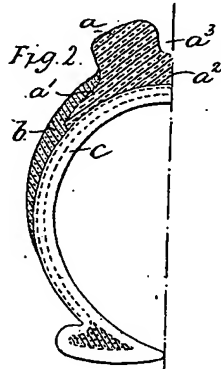
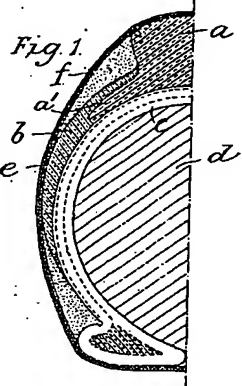
For the Applicant,

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LLOYD WISE & Co.,  
10, New Court, Lincoln's Inn, London, W.C.,  
Chartered Patent Agents.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1914.

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Multiple Views, Patent Office

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